StarterWare 02.00.00.07 Release Notes

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StarterWare Version 02.00.00.07

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Introduction

StarterWare 02.00.00.07 provides no-OS platform support for TI AM335x GP EVM, TI AM335x EVM-SK and Beaglebone which are based on TI AM335x SOC. StarterWare 02.00.00.07 provides Device Abstraction Layer, libraries, peripheral/board level sample/demo examples that demonstrate the capabilities of the peripherals of AM335x. StarterWare comes with pre-compiled binaries for bootloader and example applications which can be run from an SD card.

Features

- Device Abstraction Layer and Example Applications for the peripherals on AM335x as listed in the table below.

Features	TI AM335x EVM Examples	Beagle Bone (Base board) Examples	EVM-SK Examples
UART	• Echo Application in Interrupt Mode • Echo Application in DMA Mode	• Echo Application in Interrupt Mode • Echo Application in DMA Mode	• Echo Application in Interrupt Mode • Echo Application in DMA Mode
High Speed - I2C	• EEPROM R/W in Interrupt Mode • EEPROM R/W in DMA Mode • Temperature Sensor (Temperature Display) • Accelerometer (Board Tilt Angle Measurement)	• EEPROM R/W in Interrupt Mode • EEPROM R/W in DMA Mode • Temperature sensor and Accelerometer are not connected on BB (base board)	• EEPROM R/W in Interrupt Mode • EEPROM R/W in DMA Mode • Accelerometer (Board Tilt Angle Measurement) • Temperature sensor is not connected on EVM-SK
Multi-channel SPI	• SPI Flash R/W in Interrupt Mode • SPI Flash R/W in DMA Mode	• *No device is connected to McSPI on BB (base board)*	• *No device is connected to McSPI on EVM-SK*
DMTimer	• ISR Counting	• ISR Counting	• ISR Counting
Watchdog Timer	• WDT Demonstration	• WDT Demonstration	• WDT Demonstration
GPIO	• LCD Backlight On/Off • Audio Buzzer	• LED On/Off • Audio Buzzer is NOT available in BB (base board)	• MMC/SD Card Detection • Audio Buzzer is NOT available in EVM-SK
High Speed MMCSD	• SD Card Access with FAT File System	• SD Card Access with FAT File System	• SD Card Access with FAT File System

Real-Time Clock (RTC)	• Time Set and Get	• Time Set and Get	• Time Set and Get
USB	• CDC Device Mode • Custom Bulk Device Mode • MSC Device Mode • Mouse Device Mode • MSC Host Mode • Mouse Host Mode • MSC Host + MSC Device Mode • MSC Host + Mouse Host • Composite CDC (device) + CDC (device) • Composite CDC (device) + Mouse	• CDC Device Mode • Custom Bulk Device Mode • MSC Device Mode • MSC Host • MSC Host + MSC Device • CDC (device) + CDC (device) Other examples are not supported due to limitations on beaglebone (baseboard) 1. USB0 port is used used for debugger connection and serial port emulation 2. LCD cape daughter board is not supported in StarterWare	• CDC Device Mode • Custom Bulk Device Mode • MSC Device Mode • Mouse Device Mode • MSC Host Mode • Mouse Host Mode • MSC Host + MSC Device Mode • CDC (device) + CDC (device) • Composite CDC (device) + Mouse Other examples are not supported as USB0 port is used used for debugger connection and serial port emulation.
Ethernet	• Embedded Web Page Access • Echo Application with socket-programming	• Embedded Web Page Access • Echo Application with socket-programming	• Embedded Web Page Access - Default in Dual MAC mode • Echo Application with socket-programming - Default in Dual MAC mode • Undefining CPSW_DUAL_MAC_MODE in lwipopts.h, both examples can be demonstrated in switch mode
McASP	• Audio Loop-Back	*Audio Jacks are not available in BB (base board)*	• Tone Play (Audio IN jack is not available in EVM-SK)
EDMA	*Demonstrated in peripheral level DMA examples*	*Demonstrated in peripheral level DMA examples*	*Demonstrated in peripheral level DMA examples*
Raster	• Image Display	*LCD cape daughter board is not supported in StarterWare*	• Image Display
GPMC	• NAND Read Write	*No device is connected to GPMC on BB (base board)*	*No device is connected to GPMC on EVM-SK*
ELM	• NAND Read Write (Error Location Detection)	*No device is connected to ELM on BB (base board)*	*No device is connected to ELM on EVM-SK*
ECAP	*Available only as part of OOB Demo (LCD brightness control)*	*LCD cape daughter board is not supported in StarterWare*	*Available only as part of OOB Demo (LCD brightness control)*
DCAN	• Board-to-Board communciation	*The DB9 connectors are not available in BB (base board)*	*The DB9 connectors are not available in EVM-SK*
TSC-ADC	• Touch Screen Calibration	*LCD cape daughter board is not supported in StarterWare*	• Touch Screen Caliberation
EHRPWM	• Rotation of Haptics Motor (available in EVM daughterboard rev. 1.0E and above only)	*No device is connected to EHRPWM in BB (base board)*	*No device is connected to EHRPWM in EVM-SK*
Bootloader	• MMCSD Boot • UART Boot • SPI Boot • NAND Boot	• MMCSD Boot • UART Boot SPI and NAND flash devices are not available in BB (base board)	• MMCSD Boot • UART Boot SPI and NAND flash devices are not available in EVM-SK
Graphics Library	• Graphics Library Demo • Maze Game	*LCD cape daughter board is not supported in StarterWare*	• Graphics Library Demo • Maze Game

Out Of Box Demo	• Driven via Touch and/or Ethernet (web browser)
	• Peripherals demonstrated - LCD, Ethernet, McASP, MMC/SD, Uart, Timer, RTC, eCAP, GPIO, I2C, ADC_TSC
	• Supports Power Management
	  • DS0, DS1
	  • Wake Sources - UART, GPIO, Touch Screen and Timer
	• Supports DVFS
	  • OPP50
	  • OPP100
	  • OPP120
	  • SR-TURBO
		• Driven via Ethernet (web browser)
		• Peripherals demonstrated - Ethernet, MMC/SD, Uart, Timer, RTC
		• *Power Management and DVFS are not supported*
			• Driven via Touch and/or Ethernet (web browser)
			• Peripherals demonstrated - LCD, Ethernet, McASP, MMC/SD, Uart, Timer, RTC, eCAP, GPIO, I2C, ADC_TSC
			• Supports Power Management
			  • DS0
			  • Wake Sources - UART, GPIO, Touch Screen and Timer
			• Supports DVFS
			  • OPP50
			  • OPP100
			  • OPP120
			  • SR-TURBO

RTC Only (Low power mode)	*Not supported in EVM* due to 1. Polarity of External wake is wrongly connected in EVM 2. Silicon issue (Refer errata [1] - Advisory 1.0.5 RTC: 32.768-kHZ Clock is Gating Off)	*Not supported in BB* due to 1. External wake is not accessible in BB 2. Silicon issue (Refer errata [1] - Advisory 1.0.5 RTC: 32.768-kHZ Clock is Gating Off)	*Not supported in EVM-SK* due to 1. External wake is not accessible in EVM-SK 2. Silicon issue (Refer errata [1] - Advisory 1.0.5 RTC: 32.768-kHZ Clock is Gating Off)
SGX GFX	*Not supported in StarterWare*	*Not supported in StarterWare*	*Not supported in StarterWare*
Crypto	*Not supported in StarterWare*	*Not supported in StarterWare*	*Not supported in StarterWare*
PRU-ICSS	*Not supported in StarterWare*	*Not supported in StarterWare*	*Not supported in StarterWare*
EMAC- IEEE 1588	*Not supported in StarterWare*	*Not supported in StarterWare*	*Not supported in StarterWare*
eQEP	*Not supported in StarterWare*	*No device is not connected in BB*	*No device is not connected in EVM-SK*
NOR	*Not supported in StarterWare*	*No device is not connected in BB*	*No device is not connected in EVM-SK*

- Ethernet lwIP (a light weight IP stack) Port for AM335X
- MMC/SD Library
- NAND Library
- USB library
- APIs to configure Cache and MMU.
- Support for IRQ Preemption. StarterWare IRQ handler is now prioritized IRQ handler. However, if preemption is not desired, all interrupts can be assigned the same priority level.
- Support for switching between Privileged and Non-Privileged modes.
- Automation test framework for StarterWare.

What is Not Supported

- Routing of interrupts to FIQ
- Security Extension Features
- Data Cache Enabling on TI AM335x EVM and BeagleBone Examples
  - Demo applications for TI AM335x EVM and BeagleBone enable D-Cache. However stability issues were observed with Power Managment in EVM demo application
- Applications using standard malloc/calloc
  - StarterWare 02.00.00.07 Startup Code neither call any library nor initializes heap. Hence does not perform initializations required for malloc/calloc.

New in this Release

- Support for TI AM335x EVM-Starter Kit
  - Peripheral level example application to demonstrate UART, HSI2C, McSPI, HSMMCSD, CPSW, USB, DMTimer, WDT, Raster and Touch Screen
  - Examples to demonstrate IRQ preemption and Cache/MMU configuration
  - Bootloader which support UART and MMCSD Bootmodes
  - Graphics Library Demo and Game examples
  - Out of Box Demo example using multiple peripherals.
- Cache enabling for Ethernet
- Dual-MAC support for CPSW
- Switch support for CPSW
- Upgradation for lwIP stack to version1.4.0
- New USB Examples
  - TI AM335x EVM
    - USB Host MSC + Host Mouse example
    - USB Composite CDC (serial device) + CDC (serial device) example
    - USB Composite CDC (serial device) + Mouse example
  - BeagleBone
    - USB Host MSC + Device MSC example
    - USB Host MSC example
    - USB Composite CDC (serial device) + CDC (serial device) example
- Stack size change options enabled from IDE for IAR projects
- Removed APIs of unsupported features from the Device Abstraction Layer

Fixed in this release

Issue Identifier	Issue Description	Issue Resolution
SDOCM00090593	lwip Interface : Phy Autonegotiation Doesnt enable the Transfer mode properly. Also, no advertisement is done for Gigabit.	In /drivers/phy.c, in PhyAutoNegStatusGet() API, replace the line " if(PHY_AUTONEG_INCOMPLETE == (data & (PHY_AUTONEG_STATUS)))" with "if(PHY_AUTONEG_COMPLETE == (data & (PHY_AUTONEG_STATUS)))"
SDOCM00084262	UART: UART EDMA example application is not working in FIFO Enabled mode.	Additional APIs implemented to set transmit trigger level for DMA
SDOCM00086247	INF file required to support the USB CDC serial device on WIN 7 64 bit host	INF file for USB CDC serial device is added for WIN7 64 Bit support
SDOCM00091263	Logical error while configuring horizontal resolution of raster by RasterHparamConfig() API	RasterHparamConfig() API is modified to configure horizontal resolution correctly by shifting MSB of PLL(Pixel per line) filed to bit 3(pllmsb).
SDOCM00091265	Logical error while configuring the DMA MasterPriority by RasterDmaMasterPrioritySet() API	RasterDmaMasterPrioritySet() API is modified to configure DMA MasterPriority correctly by clearing DMA MasterPiority bitfileds before setting it and preserving the current contents.
SDOCM00091782	DMTimer example uses DMTIMER_INT_OVF_EN_FLAG as an argument to DMTimerIntStatusClear() instead of DMTIMER_INT_OVF_IT_FLAG	In examples/<evmskAM335x><evmAM335x><beaglebone>/dmtimer/dmtimerCounter.c,DMTimerIntStatusClear(SOC_DMTIMER_2_REGS, DMTIMER_INT_OVF_EN_FLAG)" line of code has been replaced with "DMTimerIntStatusClear(SOC_DMTIMER_2_REGS, DMTIMER_INT_OVF_IT_FLAG)"

SDOCM00092099	Bootloader uses E_PASS and E_FAIL which are signed for assigning to unsigned variables	Removed E_PASS and E_FAIL definitions from Bootloader. Replaced with TRUE and FALSE respectively
SDOCM00086180	Starterware web server takes a long time to start sometimes	Upgraded the httpserver_raw application to latest version
SDOCM00086319	Beagle Bone Demo application home web page is not coming consistently, when tested across networks	If DHCP is done the number of times specified in lwipopts.h, if failed. Also, upgraded the httpserver_raw application to latest version.
SDOCM00092216	AM335X: USB Control SET transfer to the device with a data payload of exactly 64 bytes fails	Changed the statement if(pDevInstance->ulEP0DataRemain < EP0_MAX_PACKET_SIZE) to if(pDevInstance->ulEP0DataRemain <= EP0_MAX_PACKET_SIZE) in line 1225 of usbdenum.c also modified the comment accordingly
SDOCM00092289	Definitions for macro values to McASPRxClkPolaritySet API are wrong in /include/mcasp.h	Macro values are corrected according to TRM
SDOCM00086390	Unable to load .out file from IAR IDE.	Code Can be loaded via XDS100 emulator
SDOCM00093234	HSMMCSD : SD Card reinsertion doesnt work with example application	Re-initialise state variables and use Card Detect gpio pin to check for card.
SDOCM00093236	MMCSD buswidth macro SD_CARD_BUSWIDTH gives wrong value	Removed typecast, as relevant bits get lost because of typecast before shift.
SDOCM00092816	GPMC : Missing ~ in front of "GPMC_CONFIG1_0_TIMEPARAGRANULARITY" in GPMCTimeParaGranularitySelect function	Added missing ~ in front of "GPMC_CONFIG1_0_TIMEPARAGRANULARITY" in GPMCTimeParaGranularitySelect function
SDOCM00092102	AM335X: USB Documentation; Clarify usage of functions "USBxyInit" and "USBxyCompositeInit"	Updated Documentation/code comments
SDOCM00091431	AM335X: Code clean-up is needed to avoid mis-understanding of 'Bulk Tick Handler' is used to process data.	Removed Bulk tick handler registration and USB tick module Initialization
SDOCM00086202	Hardware register layer files of peripherals which are not part of AM335x SoC are included in the Starterware release package.	Removed hardware register layer files of peripherals which are not part of AM335x
SDOCM00086320	The software implementation of CLZ, NumLeadingZeros() in grlib/string.c, misses a special case: the case of being passed a zero.	Updated the code to add a check that, if the parameter passed is zero, returns 32.
SDOCM00094185	CPSW Driver: CPSWCPDMARxIntStatMaskedGet() API reads RX_INTMASK_SET instead of RX_INTSTAT_MASKED register	Corrected the CPSWCPDMARxIntStatMaskedGet() API to read RX_INTSTAT_MASKED register instead of RX_INT_MASK register.
SDOCM00094186	Cache Clean/Flush Buffer APIs cleans one extra cache line	Implementation InformationCache Clean/Flush Buffer APIs are corrected to use BLT instruction instead of BLE to check if the last cache line to be cleaned/flushed is reached.
SDOCM00094198	DCAN applications are configured to accept CAN frames with Standard Ids only	Configured a Receive message object to accept CAN frames with extended Ids. To configure a message object to accept Extended Id CAN frames the CAN_EXT_FRAME macro has to be passed to function CANMsgObjectConfig as flag
SDOCM00094205	Receive objects for CAN frames in DCAN applications are configured to transmit a remote frame	Revmoved the setting of Transmit Request(TxRqst) bit for the receive message object in the DCAN applications

Known Issues / Limitations

Issue Identifier	Issue Description	Workaround
SDOCM00084263	McSPI: McSPI is not working at 48MHz, eventhough the flash and the McSPI controller supports operation at 48MHz	The frequency of operation can be kept at 24MHz for SPI Flash access
SDOCM00086275	Spurious interrupts generation can happen sometimes and generate an abort and halt the execution.	Dummy ISR is added to handle spurious interrupt during INTC initialization. This ISR just returns to the caller without performing anything.
SDOCM00090972	AM335X: Stability issues are observed with USB Multi-instance MSC class scenarios when tested with usb_device_host_msc e.g.	Issue is not observed with increased stack size. However, it is not proven that this issue is related to less stack size provided earlier.
SDOCM00094144	In TI AM335x EVM, stability issues are observed with Power Management in Demo Application when D-Cache is enabled	Stability issues were observed in Power Management while Data Cache is enabled. When some sequence changes are made, the issue is resolved, but the root cause is not yet identified. So, if any stability issues are identified, Data Cache can be disabled
SDOCM00091027	OPP50 is not supported for Core voltage domain.	None
SDOCM00091026	DS2 is not supported	None

- If the CodeSourcery installation path contains white spaces, Cygwin may give errors while linking.
- IAR IDE debugging is currently supported only with XDS100 emulator. J-Link is not supported.

Installation and Usage

- The StarterWare Quick Start Guide explains how the precompiled binary for the demo application can be run on the target
- For detailed user instructions refer to StarterWare User Guide

Dependencies

Refer to Host Platform Requirements of the User Guide

Device Support

SOCs Supported:

- AM335X

EVMs Supported:

- TI AM335x EVM Rev 1.1A and above
- TI AM335x EVM-SK Rev 1.2B and above
- Beagle Bone Rev A3 and above

Technical Support

For further information or to report any problems, contact http://e2e.ti.com

References

[1]   http://www.ti.com/litv/pdf/sprz360b

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